

AMENDMENTS TO THE CLAIMS:

Claims 1-18 (Cancelled)

19. (Currently Amended) A method of performing a fine frequency synchronization compensating for a carrier frequency deviation from an oscillator frequency in a multi-carrier demodulation system capable of carrying out a differential phase decoding of multi-carrier modulated signals, said signals comprising a plurality of symbols, each symbol being differentially coded in the direction of the frequency axis, said method comprising the steps of:

- a) determining a phase difference between phases of the same carrier in different symbols;
- b) determining a frequency offset by eliminating phase shift uncertainties related to the transmitted information from said phase difference making use of a M-PSK decision device; and
- c) performing a feedback correction of said carrier frequency deviation based on said determined frequency offset, wherein

said steps a) and b) are performed for a plurality of carriers in said symbols,

an averaged frequency offset is determined by averaging said determined frequency offsets of said plurality of carriers, and

said feedback correction of said frequency deviation is performed based on said averaged frequency offset.

Claims 20 -22.(Cancelled)

23. (Previously Presented) The method according to claim 19, wherein said step a) comprises the step of determining a phase difference between phases of the same carrier in symbols which are adjacent in the time axis direction.

24. (Previously Presented) The method according to claim 19, wherein said step b) comprises the step of eliminating phase shift uncertainties corresponding to M-ary phase shifts.

Claim 25 - 29 (Cancelled)

30. (Currently Amended) The apparatus according to claim ~~[[28]]~~32, further comprising:

means for determining an averaged frequency offset by averaging determined frequency offsets of a plurality of carriers, wherein

said means for performing a feedback correction performs said feedback correction of said frequency deviation based on said averaged frequency offset.

31. (Cancelled)

32. (Currently Amended) An apparatus for performing a fine frequency synchronization compensating for a carrier frequency deviation from an oscillator frequency, for a multi-carrier demodulation system capable of carrying out a differential phase decoding of multi-carrier modulated signals, said signals comprising a plurality of symbols, each symbol being defined by

phase differences between simultaneous carriers having different frequencies,  
said apparatus comprising:

means for determining respective phases of the same carrier in different  
symbols;

M-PSK decision device for eliminating phase shift uncertainties related to the  
transmitted information from said phases to determine respective phase  
deviations;

means for determining a frequency offset by determining a phase difference  
between said phase deviations; and

means for performing a feedback correction of said frequency deviation based  
on said determined frequency offset;

wherein said means for determining respective phases comprises means for  
determining respective phases of the same carrier in symbols which are  
adjacent in the time axis direction.

33. (Currently Amended) The apparatus according to claim ~~[[27]]~~32, wherein said  
means for performing a feedback correction of said frequency deviation  
comprises a numerical controlled oscillator and a complex multiplier.
34. (Previously Presented) The apparatus according to claim 33, wherein said  
means for performing a feedback correction of said frequency deviation further  
comprises a low path filter preceding said numerical controlled oscillator.